REMARKS

Rejections Under 35 U.S.C. § 102

Claims 1-20 and 35-40 have been rejected as being anticipated by U.S. patent No. 5,674,951 to Hargis et al. (hereinafter "Hargis") which is said to teach copolymers that include blocks deriving from oxetane monomers terminated by an R_f group (*i.e.,* perfluorinated groups) and blocks deriving from non-fluorinated alkylene oxide monomers. Hargis also is said to teach that these copolymers can be diluted with other hydroxyl-terminated polymers including hydroxyl terminated polybutadienes. Because claim 1 employs the term "connected," which the Examiner believes includes chemical reaction products, blends, or dilutions, the Examiner concludes that Hargis anticipates claim 1. With respect to claim 35, the Examiner concludes that the hydroxyl-terminated polydiene taught by Hargis reacts with the oxetane monomer to anticipate claim 35. The coating compositions and coatings disclosed in Hargis are said to be useful as low friction coatings for fibers and fabrics, as set forth in claims 13-20.

Reconsideration is respectfully requested.

The Examiner's attention is drawn to newly drafted independent claims 55 and 61. Claim 55 is a product-by-process claim and 61 is a process claim, but both include the recitation "polymerizing oxetane monomer in the presence of a hydroxyl-terminated polymer." Claim 61 defines over Hargis because Hargis does not teach the step of polymerizing oxetane monomer in the presence of a hydroxyl-terminated polymer. Indeed, and contrary to the Examiner's expressed belief, Hargis forms a block copolymer by linking two separately made polymers to one another and not by polymerizing monomer in the presence of an already-made polymer.

Applicants believe that a summary of the teaching of Hargis is warranted. Hargis is concerned with reducing the cost of polyoxetane polymer coatings.[1] This reduction in cost is achieved by incorporating non-fluorinated polymers into the coating composition.[2] Because polyols are incompatible with polyoxetane polymers, Hargis opts to form copolymers between the polyols and polyoxetane polymers.[3] These block copolymers have oxetane repeat units and

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[1] Column 2, Lines 22-27.

[2] *Id.* at lines 27-31; note that the preferred non-fluorinated polymer is poly(alkyleneoxide)diols and poly(ester)diols, which are collectively referred to as polyols.

[3] *Id.* at lines 32-36.

repeat units of non-fluorinated polymers. Urethane units, which are derived from the reaction of isocyanate groups with hydroxyl groups, link the blocks to one another.[4] Specifically, these block copolymers are synthesized by first reacting an already-made polyoxetane polymer with a polyisocyanate to form an end-functionalized polyoxetane polymer[5] which then are reacted with an already-made polyol to form a block copolymer.[6]

Accordingly, Hargis does not teach the process step set forth in claim 61. Furthermore, while the patentability of claim 55 hinges on the distinctiveness of the product formed (not the process), claim 55 defines over Hargis because, as those skilled in the art will recognize, the process recited in claim 55 will not yield a copolymer having a *urethane* linkage, which is a distinct feature of the Hargis copolymer.[7] Instead, the process of the present invention forms a block copolymer where the blocks are linked to one another via an ether (i.e., -O-) linkage.[8]

The patentability of claim 35 likewise now is apparent. In sum, claim 35 defines a block copolymer that is the reaction product of a plurality of oxetane monomers with a mono- or poly-hydroxyl terminated hydrocarbon polymer. In other words, a block copolymer is formed by polymerizing oxetane monomer in the presence of a hydroxyl-terminated hydrocarbon polymer. As noted above with respect to claims 55 and 61, the copolymers prepared by Hargis are entirely distinct because they are synthesized in a distinct manner that ultimately leads to distinct copolymers containing urethane linkages rather than ether linkages.

Claim 1 has been cancelled, but newly drafted claim 44 has been introduced in lieu thereof. Claim 44 likewise is distinct inasmuch as the copolymer includes first and second blocks connected via an ether linkage. In contradistinction, the copolymer of Hargis includes blocks connected via a urethane linkage.

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[4] Column 2, lines 38-42.

[5] Column 2, line 63 *et seq.* and column 3, lines 1-5.

[6] Column 3, lines 66 *et seq.* note that column 3, lines 6-65 teach that the polyoxetane polymers can be "diluted" but, regardless of whether this "dilution" can be construed as a mixture or reaction product, there is no polymerization of oxetane monomer in the presence of a hydroxyl-terminated polymer. Similarly, lines 14-51 of col. 4 teach that heat "adhesion promoters" can be included but, regardless of how the term "include" might be construed, there is no teaching or suggestion of polymerizing oxetane monomer in the presence of a hydroxyl-terminated polymer.

[7] See column 2, lines 38-42.

[8] Urethane linkages involve a -C(O)O- moiety rather than an -O-.

Other Amendments

Applicants note that the preambles of claims 35-40 have been amended so as to avoid any ambiguity. Also, Applicants note that claim 61 is directed toward a process for preparing a block copolymer, and Applicants believe that this claim should be examined together with the copolymer of claim 44. In support of this position, Applicants note that claim 55, which is directed to a block copolymer prepared by a particular process, adequately links newly drafted claim 61 to newly drafted claim 44.

Conclusion

In view of the foregoing amendments and arguments, Applicants respectfully request reconsideration of the rejections provided in the last Office Action. A formal Notice of Allowance of claims 2-20, 35-40, and 44-62 is earnestly solicited. Should the Examiner care to discuss any of the foregoing in greater detail, the undersigned attorney would welcome a telephone call.

This response is being filed contemporaneously with a Request for a two-month extension of time.

Respectfully submitted,

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Claims:

1. (Cancelled)

2. (Currently amended) ~~A polymeric composition according to~~ The block copolymer of claim [[1]] 45, wherein when said R_f is different, said different R_f groups, independently, is an alkyl having from 4 to 24 carbon atoms, wherein when said R_f is the same said R_f is an alkyl having from 3 to about 15 carbon atoms, and wherein said R_f groups, independently, contain at least 75 percent of the alkyl hydrogen atoms replaced by a fluorine atom.

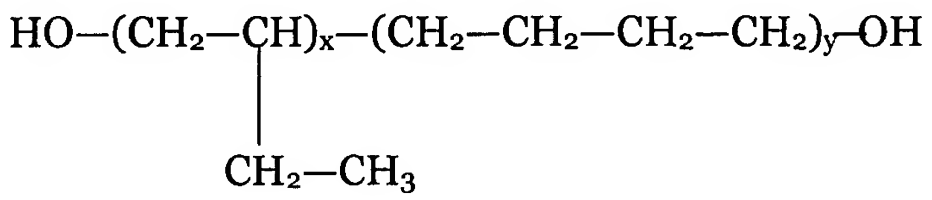
3. (Currently amended) ~~A polymeric composition according to~~ The block copolymer of claim 2, wherein n, independently, is from 1 to about 4, wherein DP is from about 3 to about 50, wherein said second block is an olefin block ~~polymer or copolymer has~~ having a number average molecular weight of from about 200 to about 4,000~~, and wherein said~~ or a hydrogenated diene block polymer or copolymer ~~has~~ having a number average molecular weight of from about 500 to about 15,000.

4. (Currently amended) ~~A polymeric composition according to~~ The block copolymer of claim 3, wherein said R_f groups, independently, contain at least 90 percent of the hydrogen atoms replaced by a fluorine atom, and wherein said olefin block polymer or copolymer is derived from olefin monomers having 2 or 3 carbon atoms.

5. (Currently amended) ~~A polymeric composition according to~~ The block copolymer of claim 4, wherein n, independently, is 1 or 2, wherein R^1 is hydrogen or methyl, and wherein said R_f is different, independently, the number of carbon atoms therein is from about 6 to about 20.

6. (Currently amended) ~~A polymeric composition according to~~ The block copolymer of claim 5, wherein said DP is from about 3 or about 4 to about 10 or about 20, wherein said ~~hydrocarbon~~ second block connected to said ~~polyoxetane~~ first block is said hydrogenated diene block polymer or copolymer~~, and wherein said conjugated diene polymer or copolymer has~~ having a number average molecular weight of from about 1,000 to about 8,000.

7. (Currently amended) ~~A polymeric composition according to~~ The block copolymer of claim [[6]] 54, wherein said hydrogenated butadiene block copolymer has the structure



wherein the ratio of said x group to said y groups is from about 0.10 to about 10, including said at least one optional repeat unit and wherein said repeat unit is derived from tetrahydrofuran.

8. (Currently amended) ~~A polymeric composition according to~~ The block copolymer of claim 7, wherein said R_f is perfluorinated.

9. (Currently amended) A polymeric composition comprising a blend of a polyolefin and the ~~composition~~ block copolymer of claim [[1]] 44.

10. (Currently amended) A polymeric composition comprising a blend of a polyolefin and the ~~composition~~ block copolymer of claim 3, wherein said polyolefin is derived from one or more olefin monomers having from 2 to 6 carbon atoms.

11. (Currently amended) A polymeric composition comprising a blend of a polyolefin and from about 0.1 to about 10 parts by weight of the block copolymer of claim 5 per 100 parts by weight of the polyolefin ~~composition of claim 5~~, and wherein said polyolefin is derived from an olefin monomer having 2 or 3 carbon atoms, or combinations thereof.

12. (Currently amended) A polymeric composition comprising a blend of a polyolefin and from about 0.5 to about 3.0 parts by weight of the block copolymer of claim 7 per 100 parts by weight of the polyolefin ~~composition of claim 7~~, and wherein said polyolefin is derived from an olefin monomer having 2 or 3 carbon atoms, or combinations thereof.

13. (Currently amended) A fiber comprising a blend of a polyolefin and the ~~composition~~ block copolymer of claim [[1]] 44.

14. (Currently amended) A fiber comprising a blend of a polyolefin and the ~~composition~~ block copolymer of claim 3, wherein said polyolefin is derived from one or more olefin monomers having from 2 to 6 carbon atoms.

15. (Currently amended) A fiber comprising a blend of a polyolefin and from about 0.1 to about 10 parts by weight of the block copolymer of claim 5 per 100 parts by weight of the polyolefin ~~composition of claim 5~~, and wherein said polyolefin is derived from an olefin monomer having 2 or 3 carbon atoms, or combinations thereof.

16. (Currently amended) A fiber comprising a blend of a polyolefin and from about 0.5 to about 3.0 parts by weight of the block copolymer of claim 7 per 100 parts by weight of the polyolefin ~~composition of claim 7~~, and wherein said polyolefin is derived from an olefin monomer having 2 or 3 carbon atoms, or combinations thereof.

17. (Original) A fabric comprising a fiber of claim 13.

18. (Original) A fabric comprising a fiber of claim 14.

19. (Original) A fabric comprising a fiber of claim 15.

20. (Cancelled)

21. (Withdrawn) A grafted polymer comprising:

a) a maleated polyolefin derived from at least one olefin monomer having from 2 to about 8 carbon atoms, said maleated polyolefin having a plurality of maleated sites, or

b) a maleated polymer derived from at least one vinyl substituted aromatic monomer having from 8 to about 12 carbon atoms, said maleated polymer having a plurality of maleated sites, and

a fluorinated compound grafted to at least one of said maleated sites of said a) maleated polyolefin or said b) maleated polymer, said fluorinated compound derived from the reaction of a fluorinated alcohol and an amino dicarboxylic acid.

22. (Withdrawn) A grafted polymer according to claim 21, wherein said a) maleated polyolefin is derived from an olefin monomer having 2 carbon atoms, or 3 carbon atoms, or combinations thereof, and wherein said b) maleated polymer is derived from styrene, α-methylstyrene, or combinations thereof.

23. (Withdrawn) A grafted copolymer according to claim 22, wherein said fluorinated alcohol has the formula

$$X - (CX^1X^2)_m—(CH_2)_n—OH$$

wherein X is H or F, wherein X^1, independently, is H or F for each repeat unit, wherein X^2, independently, is H or F for each repeat unit, with the proviso that at least one of said X, said X^1 or said X^2 is F; wherein m is from 2 to about 30, and wherein n is from about 1 to about 6.

24. (Withdrawn) A grafted polymer according to claim 23, wherein said amino dicarboxcyclic acid is glutamic acid, aspartic acid, or combinations thereof.

25. (Withdrawn) A grafted polymer according to claim 24, wherein in said fluorinated alcohol X is F, X^1 is F, and X^2 is F, wherein m is from about 6 to about 20, and wherein n is from 1 to about 4.

26. (Withdrawn) A polymeric composition comprising a blend of a polyolefin derived from olefin monomers having from 2 to about 8 carbon atoms and the composition of claim 21.

27. (Withdrawn) A polymeric composition comprising a blend of a polyolefin derived from olefin monomers having 2 or 3 carbon atoms or combinations thereof, and the composition of claim 23.

28. (Withdrawn) A polymeric composition comprising a blend of a polyolefin derived from olefin monomers having 2 or 3 carbon atoms or combinations thereof, and the composition of claim 25.

29. (Withdrawn) A fiber comprising a blend of a polyolefin derived from olefin monomers having from 2 to about 8 carbon atoms and the composition of claim 21.

30. (Withdrawn) A fiber composition comprising a blend of a polyolefin derived from olefin monomers having 2 or 3 carbon atoms or combinations thereof and the composition of claim 23.

31. (Withdrawn) A fiber composition comprising a blend of a polyolefin derived from olefin monomers having 2 or 3 carbon atoms or combinations thereof and the composition of claim 25.

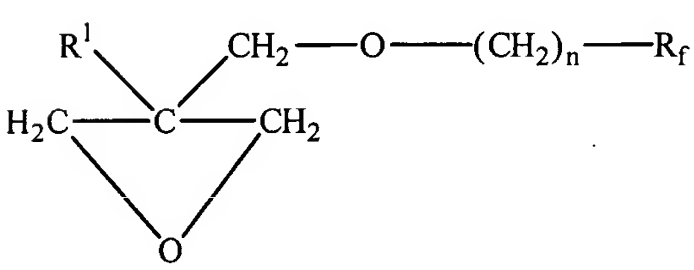
32. (Withdrawn) A fabric comprising a fiber of claim 29.

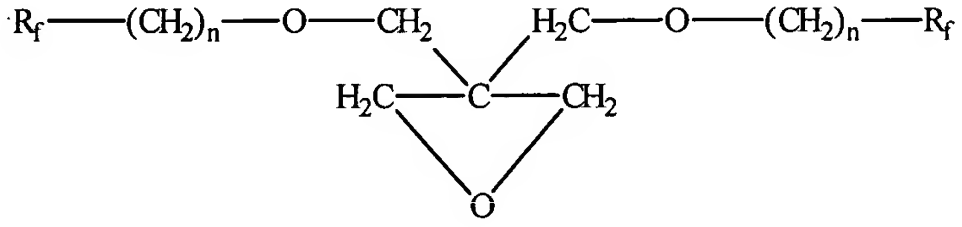
33. (Withdrawn) A fabric comprising a fiber of claim 30.

34. (Withdrawn) A fabric comprising a fiber of claim 31.

35. (Currently amended) A ~~fluorine-containing~~ block copolymer composition, comprising:

the reaction product of a plurality of oxetane monomers having the formula





where R^1 is hydrogen or an alkyl having from 1 to 6 carbon atoms, n, independently, is from 1 to 6, and wherein

R_f is a) the same for each monomer of Formula 1A or Formula 1B and is a fluorinated aliphatic having from 1 to about 20 carbon atoms, or

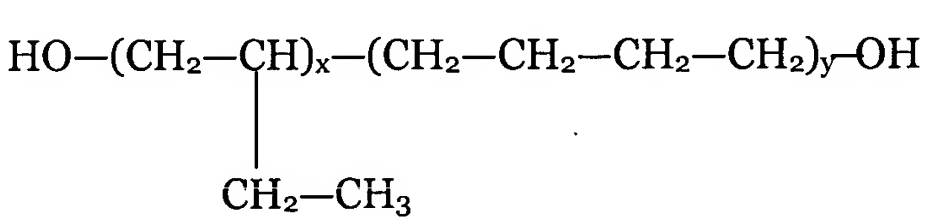
b) at least two different fluorinated aliphatics having said Formula 1A or Formula 1B and, independently, has from about 2 to about 30 carbon atoms,

with a mono or polyhydroxyl terminated hydrocarbon polymer comprising: an olefin polymer or copolymer derived from at least one olefin monomer having from 2 to about 8 carbon atoms; or a hydrogenated diene polymer or copolymer derived from at least one conjugated diene monomer having from 4 to about 10 carbon atoms.

36. (Currently amended) A ~~fluorine-containing~~ block copolymer composition according to claim 35, wherein when said R_f is different said different R_f groups, independently, is an alkyl having from 4 to 24 carbon atoms, wherein when said R_f is the same said same R_f is an alkyl having from 3 to about 15 carbon atoms, and wherein said R_f, independently, contain at least 75 percent of said alkyl hydrogen atoms replaced by a fluorine atom.

37. (Currently amended) A ~~fluorine-containing~~ block copolymer composition according to claim 36, wherein at least 75 percent of the hydrogen atoms of said R_f alkyl group is replaced by a fluorine atom.

38. (Currently amended) A ~~fluorine-containing~~ block copolymer composition according to claim 37, wherein n, independently, is 1 or 2, wherein R^l is hydrogen or methyl, and wherein when said R_f is different, independently, the number of carbon atoms therein is from about 6 to about 20, and wherein said hydrogen carbon polymer is said hydrogenated butadiene block copolymer and has the structure



wherein the ratio of said x group to said y groups is from about 0.10 to about 10.

39. (Currently amended) A ~~fluorine-containing~~ block copolymer composition according to claim 38, wherein said reaction product is a diblock or a triblock copolymer, wherein said hydrogenated diene block copolymer has a number average molecular weight of from about 1,000 to about 8,000.

40. (Currently amended) A ~~fluorine-containing~~ block copolymer composition according to claim 39, wherein said R_f is perfluorinated, and wherein x of said hydrogenated butadiene block copolymer is about 2 and wherein said y is about 8.

41. (Withdrawn) A fiber comprising a blend of a polyolefin and a composition of claim 35.

42. (Withdrawn) A fiber comprising a blend of a polyolefin and the composition of claim 37, wherein said polyolefin is derived from one or more olefin monomers having from 2 to 6 carbon atoms.

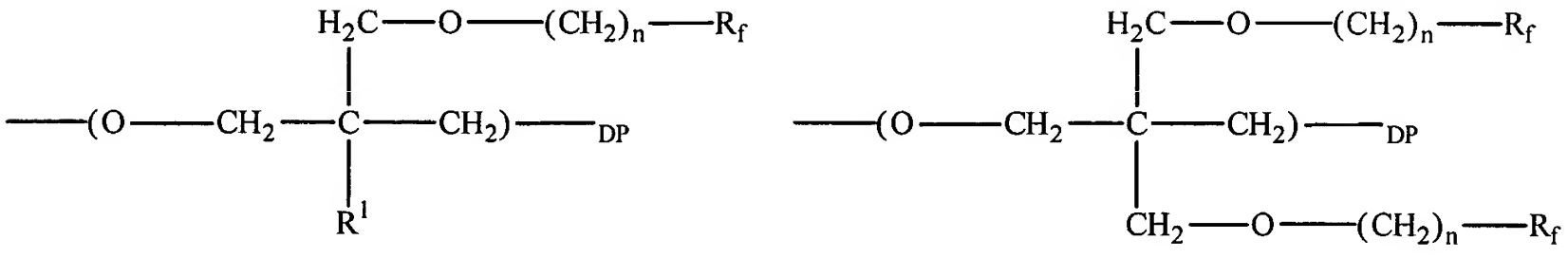
43. (Withdrawn) A fiber comprising a blend of a polyolefin and from about 0.1 to about 10 parts by weight per 100 parts by weight of the composition of claim 39, and wherein said polyolefin is derived from an olefin monomer having 2 or 3 carbon atoms, or combinations thereof.

44. (Newly added) A block copolymer comprising:

a first block having repeat units that include pendant ether groups having a terminal fluorinated group, and

a second block having hydrocarbon repeat units, where the first block is connected to the second block via an ether linkage.

45. (Newly added) The block copolymer of claim 44, where the first block has repeat units defined by one or both of the formulae



where R^1 is an alkyl group having from 1 to 6 carbon atoms, n is independently an integer from 1 to 6, R_f is a fluorinated group, and DP, which represents the number of repeat units within said first block, is an integer from 2 to about 100.

46. (Newly added) The block copolymer of claim 45, where the number of repeat units (DP) within said first block is from 3 to about 50.

47. (Newly added) The block copolymer of claim 45, where R_f is the same for each repeat unit within said first block and is a fluorinated aliphatic group containing from 1 to about 20 carbon atoms.

48. (Newly added) The block copolymer of claim 45, where the repeat units within said first block include at least two different fluorinated aliphatic groups containing from 2 to about 30 carbon atoms.

49. (Newly added) The block copolymer of claim 47, where the fluorinated aliphatic groups are characterized by having at least 50% of the available hydrogen atoms replaced by fluorine.

50. (Newly added) The block copolymer of claim 48, where the fluorinated aliphatic groups are characterized by having at least 50% of the available hydrogen atoms replaced by fluorine.

51. (Newly added) The block copolymer of claim 47, where the fluorinated aliphatic groups are characterized by having at least 95% of the available hydrogen atoms replaced by fluorine.

52. (Newly added) The block copolymer of claim 48, where the fluorinated aliphatic groups are characterized by having at least 95% of the available hydrogen atoms replaced by fluorine.

53. (Newly added) The block copolymer of claim 44, where said first block includes at least one repeat unit derived from an oxirane, a 4-membered cyclic ether, a 5-membered cyclic ether group, 1,4-dioxane, 1,3-dioxane, 1,3-dioxalane, trioxane, caprolactone, or combinations thereof.

54. (Newly added) The block copolymer of claim 44, where said second block comprises an olefin polymer or copolymer derived from at least one olefin monomer having from 2 to about 8 carbon atoms or a hydrogenated diene polymer or copolymer derived from at least one conjugated diene monomer having from 4 to about 10 carbon atoms.

55. (Newly added) A block copolymer prepared by a process comprising polymerizing at least one type of oxetane monomer in the presence of a hydroxyl-terminated polymer to provide the block copolymer.

56. (Newly added) The block copolymer of claim 55, where the hydroxyl-terminated polymer is a hydroxyl-terminated polyolefin or a hydroxyl-terminated hydrogenated polydiene.

57. (Newly added) The block copolymer of claim 56, where by hydroxyl-terminated polymer is a poly hydroxyl-terminated polymer.

58. (Newly added) The block copolymer of claim 55, where the oxetane monomer includes pendant ether groups, and where the terminal portion of the ether group is a perfluorinated group.

59. (Newly added) The block copolymer of claim 55, where said step of polymerizing the oxetane monomer takes place in the presence of a catalyst.

60. (Newly added) The block copolymer of claim 59, where the catalyst includes boron trifluoride.

61. (Newly added) A process for preparing a block copolymer, the process comprising polymerizing at least one type of oxetane monomer in the presence of a hydroxyl-terminated polymer.

62. (Newly added) The block copolymer of claim 45, where R_f is a perfluorinated group.